OCTOBER, 1913

THE AQUARIUM

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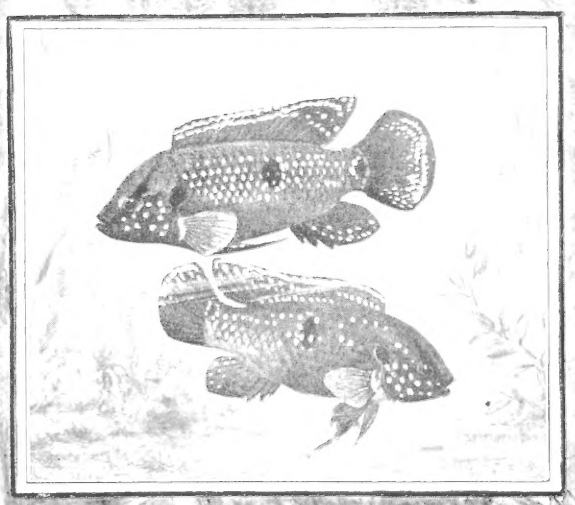

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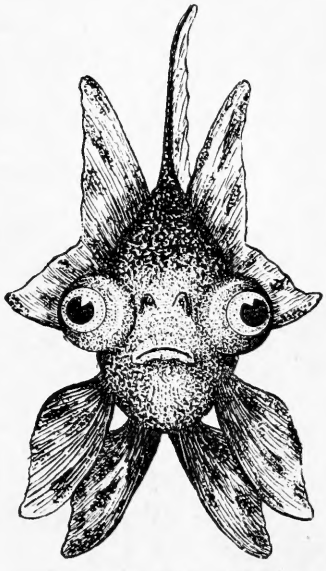

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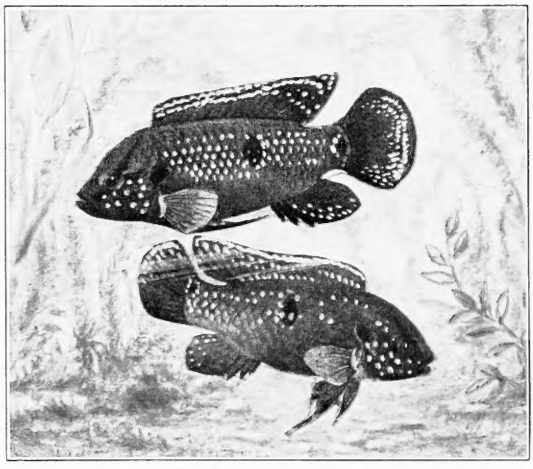
THE AQUARIUM

VOLUME II OCTOBER, 1913 NUMBER 5

Hemichromis Bimaculatus or Red Chromides

By J. W. GAGE

This member of the Cichlidæ family is a native of the Amazon District of Brazil, frequenting shallow or stagnant waters, ranging from 65 degrees to 80 degrees Fahrenheit. The head is very blunt and heavy, tail spatulate and extremely powerful. The fish has two pectoral, two pedal, one dorsal and one anal fin. The color is reddish brown with small emerald greenish spots, except during spawning time, when the head and lower half of the body are a deep rich red, hence the name, Hemichromis, or half red.



Hemichromis Bimaculatus.

This species is carnivorous and will ravenously devour not only its own young but all young fish, also scraped raw beef, fish worms, dried shrimp, chopped oysters or clams, meal worms, etc.

My first acquaintance with this species was in the late fall of 1912, at which time I secured a pair about eight months old, and set them up in a brass bound glass tank, 16″ long x 10″ wide x 11″ high, having a 2″ bottom of well washed lake sand, and planted with Vallisneria Spiralis, Sagitaria Natans, Ludwegia, Elodia and floating water fern, and filled within one inch of the top with water which had been standing about two weeks to insure its being flat or ripe, and fed them as wide a variety of food as possible.

In about a month the tank had a beautiful growth of plants and was as nearly balanced as any I ever had. But by this time there seemed to be considerable cause for contention in this family, so much so, in fact, that I thought best to separate them by a glass partition, to prevent their killing one another.

When they found it impossible to attack one another they were apparently so angry that they started in on the vegetation in their respective quarters, and within twenty-four hours had every spear, either routed out or cropped off close down to the roots, and I noted that their color was changing from the reddish brown to a deep, rich red about the head and stomach, and the green spots became very brilliant, or like emeralds.

One Saturday morning before leaving home I noticed that the strife was apparently over, and that the combatants seemed anxious to become reconciled. On my return at 2:30 P. M. I found to my great regret that the female had made a deposit of eggs, covering a nearly round spot about 2″ diameter on her side of the glass partition, and the male was frantically trying to fertilize them.

I removed the partition with the eggs remaining on it and have kept it now for several months as a specimen. But very few of the eggs have fallen off, although no fixing solution was used to secure them.

The spawning time was now over, and am pleased to state that there was no more scrapping. Within a week the fish were back to normal color, and did not molest the vegetation which had again been planted.

The next spawning occurred in April, 1913, when the tank was again nicely balanced. A flower pot 4″ diameter at the wide end was prepared by knocking out the bottom and filing off the sharp edges and placed on its side in the tank with the wide end towards the front. At once both the specimens started in to clean it up, in spite of the fact that it had been most carefully scrubbed.

During this time they both took on a beautiful red color, and the maneuvers of their mating were very interesting to watch. The male would start to swim around the female, and then she would start to swim around him, with the result that they were constantly swimming in circles. Then one would come in close to the side of the other and deliver a love slap with the tail, backing off and strutting like a peacock, displaying all the emerald green spots which were like one encrusted mass of scintillating jewels. The growth of the roe in the female had now become quite perceptible.

Fortunately I was able to observe the actual deposit of the eggs on the pot, as it occurred on Sunday morning. The female made a deposit by swimming in circles above and just touching the spot selected for a few moments, then on moving to one side was immediately followed up by the male, who apparently fertilized the different deposits as fast as they were made. This deposit was about the same size as the one previously described. When it was completed the pair took turns in hovering over the eggs and fanning with the pectoral fins to keep fresh water coming over them and to keep silt and dirt from lodging among them. They kept up this process for forty-eight hours, one fanning while the other dug little hollows in the sand at the roots of some plants they had cropped off. The temperature of the water was about 75 degrees to 78 degrees Fahrenheit, and the hatching was completed in a little over 60 hours.

As fast as the eggs hatched, the young were taken in the mouths of the parent fish and deposited in one of these hollows. When they had all been removed from the pot, the parents again took turns in fanning the little group, which, to the naked eye, appeared like a small mass of agitated gelatine, but on closer inspection with a powerful reading glass the baby fish were plainly discernible. On the stomach of each I could see the yolk-sack of the egg which furnishes nourishment for the little fellows until they are able to swim and hunt their own food.

It took about four days for them to absorb the yolk-sacks, during which time each little individual fish kept up

a constant wriggling, which caused the agitation of the jellylike mass.

During these four days they were repeatedly carried from one sand pocket to another in the mouths of the adults, and on the fifth morning, which happened to be bright and sunny, the tank seemed to be literally alive with baby fish out for their first swim under the chaperonage of the female, who seemed to watch over them with most pronounced maternal attention, and if one seemed to be in any difficulty she would take it in her mouth and spit it out again in a portion of the tank where conditions seemed to be more favorable. She was able to hold their attention and govern their movements by swimming backward very slowly, causing them to follow by frequently stopping and strutting. In the evening I found them to be carefully herded in a close group and tucked away for the night in one of the sand pockets, like a lot of little helpless children with their mother standing guard to protect them from danger.

From the time they started to swim the male began to lose interest, and soon resumed his old color, and, as on the third day after the babies' first swim I caught him indulging his canibalistic appetite, I removed him to other quarters.

The tank containing these specimens was in a window with south exposure, and by the time they could swim nicely there was a good growth of Algea; Infusoria also had developed, on which the babies fed, and their growth was very rapid.

During all this time the female was fed largely on fish worms, scraped raw beef, or dried shrimp, a ration which the babies were too small to touch, but on my squeezing the milky substance from live meal worms into the tank when the young were three weeks old, the mother showed her maternal instinct by taking this milky substance into her mouth and apparently masticating it, then spitting it out in fine particles which the fry greedily devoured.

When the young were one month old the mother was removed, and from that time they were able to take care of themselves.

I get the best results in spawning this variety by not using æriators, by providing plenty of vegetation and placing the tank in the sunlight so as to obtain a good growth of Algea.

Under no conditions should silt or dirt be syphoned off during spawning season, as this accumulation seems to set up the condition most favorable to the young when they are big enough to take care of themselves.

The Effects of Inbreeding

(Contributed)

Everywhere in nature are evidences of a pronounced antipathy to self-fertilization and inbreeding. While it is true that desirable characteristics can be developed and perpetuated by inbreeding, it is always at the expense of vigor, and results in the degeneration of other parts, and even sterility. Cross-breeding within the species, in contrast, with the resulting infusion of new blood into any strain, be it fish, bird or beast, means increased size, rapidity of growth, strength, vigor, and fertility.

The mere inter-crossing of different lines of a species (unrelated individuals), by itself does no good. The advantage depends much upon the selection of individuals of desirable characteristics and stamina. The occasional acquisition of a good male fish from another breeder should be considered a necessity. Were

it possible to practice the line-breeding plan of the poultry fancier, this would not be so essential.

Animals, having the power of locomotion, and free to move about from place to place mingling with their kind, have not been provided with means to prevent inbreeding. Movement, restricted only by the climatic and food requirements of the species, renders the liability of consanguinity very slight. Plants, however, have developed various means to insure cross-fertilization. Many species bear the male and female flowers on separate individuals, or, when a species produces flowers of both sexes, or hermaphrodite (combination) flowers on the same plant, the organs of the sexes do not mature simultaneously, thus making fertilization by another plant necessary. The pollen, or male element, is carried from flower to flower by the wind or insects.

Nature frowns with equal vehemence upon inter-breeding of divergent species, or hybridizing. The result is usually loss of vigor, degeneracy and sterility. More commonly, even though the individuals may be of closely related families, the attempt is productive of no result whatever. Anatomically, the animals may be very much alike, yet the spermatozoon of the male is unable to effect the ovum of the female. There are, however, instances where the offspring, while sterile, and thus unable to reproduce their kind, are yet vigorous. The mule may be cited as an example. A hybrid has been secured by crossing the American bison (buffalo) with the domestic cattle that is said to be very vigorous. Exceptions, of course, may be found to any rule, but when we oppose Nature, we have forces arrayed against us, the workings of which we do not comprehend. Far better that we enlist the help of the Laws of Nature than to controvert her power.

Goldfish breeders, working as they do with the very concentrated product of selective inbreeding, should make every effort to out-breed without losing the desirable characteristics they aim to retain in their stock with increased development. The writer is familiar with the methods and stock of some of the breeders of the best goldfish in America, and knows well that inbreeding is unintentionally practiced to the detriment of their strain. Father and daughter are being bred together. Splendid development of fins is being secured, but on fish of extremely low vitality and short lives. With the usual methods of breeding, it is almost an impossibility not to inbreed. The fry are gradually assorted according to size without regard to parentage. Every breeder, sooner or later, by judicious selection of males and females, hits upon a combination that produces a number of fry of excellent form. With his desire for perfection, it is natural, that when this same fry has grown to maturity, relationship not being positively known, he will mate brother and sister together. The result is very apt to be weaklings. My opinions may be disputed and considered mere theory, but I feel that it will be hard to adduce facts to offset them, as pedigree breeding is scarcely possible with goldfish. The columns of the magazine are open for a discussion of this subject.

The Diatomacea as Food for Fish Fry

By W. A. POYSER, Hammond, Ind.

Mr. Smith, in his interesting article on Plankton and Nepton in the June issue, has indicated a field which is not only

a rich one for investigators, but one that is of general interest to fish breeders as well. The plant and animal life of which plankton is formed, furnishes the first food of the newly-hatched fish and more mature individuals of many species. It is this phase of the subject that will prove of interest to the aquarist who may not have the facilities or the inclination to study the purely scientific aspect of the problem. The economic and the scientific viewpoints are, however, closely related.

The diatom is one of the many constituents of plankton, and has received a good deal of attention from microscopists in recent years. No greater proof of its importance as a food for fish can be deduced than the fact that the scientist in quest of specimens loses no opportunity if examining the stomachs of mollusks and fish, for there it is that he is sure to find a goodly collection. Many a rare specimen has been added to the cabinet of the student by this means.

The diatoms are a large group of plants, so very small that the aid of the microscope is necessary to reveal their diversity of beautiful forms. They thrive in both fresh and salt water; so abundant and widely distributed are they that there is scarcely a pond or ditch in which specimens may not be found. That they have existed in vast numbers for æons of time their silicious remains, which are found in all parts of the world, frequently in almost pure fossil deposits which are of the utmost commercial value, give testimony. Many dental and metal polishes, the action of which is abrasive, not chemical, contain as cutting material the remains of the diatom. In boring artesian wells these fossils have been brought up from a depth of 600 feet, a fact indicative of their great age and long life period on the earth. As to the vast extent of such deposits it is a fact worthy of notice, that the city of Richmond, Virginia, is built upon a strata of almost pure diatom remains, in some places lying fifty feet below the surface. The process of forming such deposits is going on at the present time in the bottoms of our rivers and lakes.

Formerly, naturalists placed this family in the animal kingdom in consequence of their peculiar movements; at the present time, however, a more intimate acquaintance with their nature and habits, acquired by the aid of improved microscopes and confirmed by chemical experiments, has resulted in their being transferred to the vegetable kingdom.

The plant consists of a silicious envelope of three parts, made up somewhat after the fashion of the old cardboard pill-box, with top and bottom joined by a ring. They are of every conceivable shape, all microscopic in size. Their great beauty consists in the marking or sculpture of the envelope, which is greatly diversified in its minute pattern, some species being marked with parallel lines so fine, that 90,000 of them measure but one inch in breadth.

The frustules contain protoplasm; whether or not it is structural is a question that has been widely debated, as has also the peculiar power of movement. Diatoms are able to proceed backward or forward, with no visible means of propulsion, and after much discussion the question remains a mooted one.

I have been informed that a method has been evolved to propagate diatoms as a commercial food for oysters, but no details on the subject are at present available. If successful, the discovery will prove a great boon to fish breeders.

Sheep Manure as a Cultivator

By FRANK J. MYERS

In a past issue of THE AQUARIUM there appeared an article on the advantages of using sheep manure as a cultivator for aquatic plants in the household aquarium. I thereupon decided to do some investigating along this line, as I had always had very poor success with Sagittaria under certain conditions of light. Some years ago I had an eighty gallon aquarium built to fit into a square space containing three windows with western exposure. The dimensions of this aquarium were not what they should have been, the depth being too great in proportion to the width; besides it was subjected to the full glare of the afternoon sun. Plants, with the single exception of Anacharis, never grew well in this aquarium. I tried Sagittaria many times with the same result; they never shot off runners, and gradually died out each time.

Accordingly, I set up two twelve gallon aquaria in the following manner: In No. 1, I placed a layer of sand about one-half inch thick; then over this I sprinkled a thin layer of pulverized sheep manure, just enough to cover the sand well, then about an inch and one-half of clean sand over all. I planted this aquarium with Sagittaria and placed it in a strong west light, exposed to the afternoon sun, a position identical with that of the unsuccessful large aquarium.

In aquarium No. 2, I placed two inches of clear sand, planted Sagittaria without adding the sheep manure deciding to feed these plants directly by injecting a saturated solution of the manure among the roots, by means of a special syringe consisting of a thin glass tube about fifteen inches long with a rubber ball on one end. I filled both aquaria with water at the same time, and injected the aqueous solution among the roots in aquarium No. 2, three times a week. About the third day, in aquarium No. 1, I noticed clouds of pulverulent, nebulous organizations ascending in thin columns from the sand up to the surface of the water, and there spreading out into cloud-like masses. A microscopical examination proved this to be composed of countless myraids of spores of a certain fungus belonging to the Phycomycetes. Let us now digress a bit for a few words about fungi. The Phycomycetes (Alga-fungi) are so called on account of the fact that they resemble certain Algæ more closely than other fungi, and are supposed to have been derived from the Algæ, having lost their chlorophyll (sap-green) and power of independent living.

Saprolegnia, a genus to which our spores in aquarium No. 1 belong, resemble certain Algæ - Vaucheria and Cladophora so closely that connection seems plain. The mycelium (working body) is composed of cœnocytic hyphæ (small thread-like filaments which have no partition walls dividing them into cells) the tips of which become swollen and are cut off by septa (partitions). Within these chambers numerous bicilate zoospores (spores with two cilia, which swim about in the water) are formed, which after being motile for a short time, settle down and rapidly form new mycelia. This all strongly suggests Vaucheria and Cladophora. Now the genus of Saprolegnia which appeared in aquarium No. 1 seem to be perfectly harmless to goldfish in good condition. After a few days these countless spores settled down and formed mycelia on the darker portions of the substratum.

In about ten days all the fungus began to disappear very rapidly, the water cleared beautifully, and I noticed young shoots of Sagittaria beginning to show up. They increased with surprising rapidity—the water did not turn green and conditions seemed eminently satisfactory. Then I introduced fish, which did well from the first. Now, after seven months, in spite of poor conditions, the plants are thriving and multiplying in my 80 gallon aquarium. Aquarium No. 2 gave me exactly similar results, only much slower and with more work, as the plants had to be fed continually. I do not hesitate in recommending the sheep-manure method to anybody who is troubled with a poor growth of plants, provided the aquarium is set up as I have suggested.

Now, in conclusion, a few words about Daphnia.

Some time since, I wrote an article for THE AQUARIUM, on the propagation of Daphnia, in which I suggested feeding them on infusoria raised in hay infusions. I have recently come to the conclusion that the very best medium to employ in raising Daphnia in quantities is either Spirogyra, Cladophora or Zygnema. Since September 10th, 1912, I have raised, in a twelve gallon aquarium, sufficient Daphnia to supply one dozen large fish with a liberal feed once a week, and my start consisted of about a quart of Spirogyra and Cladophora. These Algæ have been growing and furnishing the young and old Daphnia with plenty of food ever since. I see no reason why a breeder cannot breed Daphnia enough to raise his young fish on if he uses Spirogyra and a sufficiently large tank, making the start in the fall.

Of Interest Regarding Gambusia

By W. S. HILPERT, Chicago, Ill.

One of the most interesting studies carried out during the past summer at the Laboratory of the Bureau of Fisheries at Beaufort, N. C., is that reported by Dr. Albert Kunz, of the University of Iowa, in "Science," Sept. 19th, 1913.

Dr. Kunz's studies were devoted to the morphology of the reproductive organs of Gambusia affinis which abounds in the vicinity of Beaufort, in all the fresh water streams entering the harbor. His efforts were especially directed to the structure of the apparatus controlling the modified anal fin in the male Gambusia. "This fin," the report tells us, "functions as an intromittent organ and is controlled by a powerful muscle which has its origin on a boney process projecting ventrally from the fourth to the last abdominal vertebræ and the modified anal spines of the proximal end of the anal fin rays. The third, fourth and fifth rays of the fin are enlarged, greatly elongated and variously curved, bearing short spines on their distal portions. The interhemal which articulates with the third ray is enlarged and sufficiently elongated to articulate with the two anterior processes, on which the muscle controlling the anal fin has its origin. The fifth ray may be drawn forward at one side of the fourth and brought into proximity with the third. In this manner a groove or tube is formed through which the milt is transferred from the male to the female."

"The utility of the study in natural history will be recognized by anyone possessing even rudimentary ideas of the science."—*Milne-Edwards.*

THE AQUARIUM

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VOL. II OCTOBER, 1913 NO. 5

Since the publication of the last issue steps have been taken, which we trust will do away with many annoyances of the past. As we have explained to our readers, none of the staff receive any financial returns for their work. We do this cheerfully, for the sole purpose of furthering our hobby in a scientific way. It is for this reason that we are compelled to ask your indulgence for a little longer, until we get matters in such shape that we can publish this magazine on time. We regret this necessity, but it is the only means by which THE AQUARIUM can live and continue to be of value to subscribers and advertisers.

The loss of our editor, and a change of publishers at the same time, left us in a rather unfortunate position. This difficulty, however, has now been obviated, and we hope to make up for lost time. Those of our subscribers who have written us concerning the non-arrival of the magazine will find our explanation here.

If you have any criticisms to make, please send them in to the editor. He will always be glad to entertain a just complaint, and to remove the cause of it if possible. If there are any particular subjects you would like to see treated in the columns of THE AQUARIUM, a letter to that effect will be appreciated.

At the same time, we want to impress upon you the fact that THE AQUARIUM is *your magazine*. It will be no better than you make it by your support. If you derive benefit from some of the articles that appear in its pages, do not overlook the fact that each one can help by writing short articles concerning experiences with any particular species of fish or any special form of apparatus. These articles will be of advantage to your brother aquarists, and will give to the magazine the personal element, which is so desirable. Do not hesitate because your article seems to you to have no merit, or because you think you have no aptitude for writing. The material will all be carefully revised and put into shape for the printer.

Now a special word to the advertisers. We want you all to feel that you are getting value received. Unless we have your confidence we cannot have the greatest measure of success. You have been patient with us in our difficulties, and we appreciate your forbearance. The business manager is constantly in touch with the trade, and will be glad to answer any inquiries concerning his particular province. We want to give everybody a square deal; we invite any with grievances to communicate with the Business Manager.

At the same time we must have some

rules for the guidance of advertisers. In the first place, we do not send advance proof of advertisements. The sizes of type and kindred matters will be kept just as near to the advertisers' desire as possible, but we must have a little leeway in view of contingencies. We reserve the right to blue-pencil advertisements which do not conform to our standards, but any such changes will be indicated before publication. We will not accept flamboyant or spectacular advertisements. We also reserve the right of requiring payment in advance if necessary.

Auction Sale

The Aquarium Society of New York wishes to announce that on Thursday, Nov. 13th, 1913, they will hold a public auction of various varieties of fish, water plants, and implements pertaining to aquaria. This sale will be held at the German-American School House, Sherman Ave., Jersey City, N. J., and should be taken advantage of by fanciers as well as by amateurs desirous of adding to their collections.

Crayfish *

By MORRIS GIBBS, M. D., Kalamazoo, Mich.

In wandering about the lowlands, an observant person may often find a number of small mounds, generally near the edges of ditches or streams. These little heaps vary from three to six inches in height and are sometimes nearly a foot across, and are made up of small pellets of mud and clay. In the centre of each is a hole of an inch or more in diameter, which serves as an outlet or inlet for the little architect who inhabits the well. These little tunnels or wells are generally supposed by the ignorant and unobservant to be snake holes, and they are avoided by timid children or broken into by the bolder ones, but to the thoughtful observer they are ever as ource of instruction and interest.

It is very difficult to discover the well digger at work, for these little fellows appear to work chiefly at night. Still I have twice observed the sly laborers carrying out the soil from their burrows in broad daylight, and the workers may be busy all day long in their underground abodes. The makers of these wells are freshwater lobsters or crayfish, often called crabs by the boys. If an observer sits quiet for a time near these heaps, he may see a claw carefully raised out from the hole and then several pairs of legs follow, together with two of bead like eyes. If the inhabitant of the tunnel sees the least suspicious movement, he drops back into the burrow, and only reappears after quite a lapse of time—if at all that day. A new observer is surprised to find that the maker of these tunnels is the same creature that he has often seen crawling about on the bottoms of the streams and ditches; just a smaller relative of the big lobster that we eat.

It is probable that these wells are begun at the top, but I cannot learn that anyone has seen the beginning of a tunnel. Then, as the well gets deeper, the pellets are brought up and deposited at the sides, and in time these accumulations form walls at the sides of the well and take the form of chimneys. The limey nature of the material found in the deeper soil in the lowlands causes the pellets to stick together in such a manner that the result is quite like a mud chimney.

These tunnels always lead to water which is generally found at a depth of two feet or less, but at times the well is all of four feet deep.

*Reprinted from *The Atlantic Coast Naturalist.*

COMMENTS AND QUERIES

Please advise how to care for sunfish in the house, and what to feed them.

W. B. WRIGHT.

Prepare a rectangular all glass or metal bound tank, with about a 2″ layer of well washed lake sand in the bottom, and plant one-half of this surface with any of the water plants advertised in this publication. A tank about 15″ long, 10″ wide and 11″ high would be large enough for four, three-inch sunfish. Feed once a day, preferably in the morning, with any of the standard advertised foods, alternating twice a week with either scraped "lean" raw beef, or fish worms, chopped if very large. The only care necessary is not to feed more than the fish will consume daily; the quantity can only be determined by observation.

How can I keep fish worms indoors over winter?

Get one or more empty Fels Naptha soap boxes from your grocer, and see that the sides and bottoms are securely nailed on. Put a 2″ layer of black loam in the bottom and distribute a good layer of worms over this; then add other layers of earth and worms until you have three layers of worms and the upper covered with about 1″ of earth. Next get three pieces of 1″ board which when placed end to end will about cover the surface. One inch of the surface should be exposed around the edge of the cover. Next place a brick on each of these boards, and set the box in a moderately cool place and keep the earth moist by occasional sprinkling. Every sixty days mash a cold potato that has been boiled in the jacket, and mix thoroughly with the top layer of earth. When you wish to have worms for feeding lift off one of the bricks, raise up the board, and you will find them on the surface. Do not dig up or disturb the contents of the box more than is absolutely necessary to supply your requirements.

A Common Mistake

An aquarist can scarcely make a worse mistake than that of adding colder water to that which is in his aquarium. The sudden change of temperature resulting from such a course of action, almost invariably cause the fish to take cold. The glands of the skin which secrete the natural waterproof covering of the body become inflamed and emit an excessive amount of slime, which turns white, giving the body a fungus appearance. The gills become congested, and in advanced stages the tail and fins shred and crumble away, and the fish soon dies.

About the best treatment is to place the fish in a strong salt solution for a few minutes, taking care not to prolong the immersion to the point of exhaustion. Repeat the bath once or twice a day until the patient recovers.

I do not think of a book on the subject that emphasizes this danger enough; though many of them devote much space to fungus, which is in reality so similar to the effects of chilling, that the beginner often cannot tell the difference, and does not know what the trouble is. I remember well the trouble I used to have. I think it is safe to say that at least two-thirds of the death-loss to amateurs is due to this cause. A dairy thermometer will prove a useful and inexpensive aid to any aquarist.

SOCIETY BULLETINS

Brooklyn Aquarium Society

Regular meetings 2nd & 4th Tues. in every month except July & Aug. at Fairchild Bldg. 702 Fulton St., at 8 P. M.
Initiation Fee, $1.00
Annual Dues, $2.00

President.....Dr. Frederick Schneider, 64 Grove Street
Vice-President.....Geo. W. Post, 52 Herkeme Street
Corresponding and Recording Sec'y.....Harry Roessle, 116 Harman Street
Treasurer.....Theodore P. Fritz, 805 Halsey Street
Library.....J. Schweickert
Local Editor.....Dr. Frederick Schneider, 64 Grove Street
Local Business Manager.....Owen H. Smith, 702 Fulton Street

Chicago Fish Fanciers' Club

Regular meetings on the Second Wednesday at 809-12 City Hall Square Building, 127-139 North Clark St., at 8:30 P. M. on 4th Wednesday where announced.
Initiation Fee, $1.00
Annual Dues, $1.00

President.....F. S. Young, 428 West 66th Street
Vice-President.....Dr. G. A. Preusker, 457 North Avenue
Secretary.....W. B. Hoffman, Hammond, Ind.
Treasurer.....Carl Fossetta, 1341 George Street
Acting Librarian.....F. G. Orsinger
Local Editor.....F. G. Orsinger, 123 S. Oakley Boulevard
Local Business Manager.....C. J. Borgstrom, Jr., 1408 Kedzie Avenue

The Aquarium Society

Regular meetings on the Second Thursday at the German-American School, Sherman Ave., Jersey City, and on the Fourth Friday at the American Museum of Natural History, 77th St. and Central Park West, New Nork, each month except July and August. Corresponding membership, $1.00 Annually.
Initiation Fee, $1. Dues, $2

President.....Edw. W. Kierann, 22 Nassau Place, East Orange, N. J.
Vice-President.....O. H. Smith, 23 Jacob Street, New York City
Recording Secretary.....Arthur Osborne, 42 South St., Jersey City, N. J.
Corresponding Secretary.....Herman Osmer, West New Brighton, N. Y.
Treasurer.....H. A. Richtberg, 85 South 16th St., East Orange, N. J.
Librarian.....Herman Hoffmeister, 165 Webster Av., Jersey City, N. J.
Local Editor.....John Treadwell Nichols, Am. Museum of Nat. History
Local Business Manager.....Carl P. Ording, 1931 Broadway, New York

Philadelphia Aquarium Society

Regular meetings on the Fourth Wednesday, at 1414 Arch Street.
Initiation Fee, $1.00 Annual Dues, $1.80. Corresponding Membership, $1.00 Annually.

President.....H. R. Lippincott, Collingswood, N. J.
Vice-President.....Charles Paxson, 2534 N. 11th Street
Treasurer.....Hiram Parker, 224 N. Wilton Street
Secretary.....L. M. Dorsey, Jr., 2219 N. 19th Street
Local Editor.....Wm. T. Innes, Jr., 1824 N. Park Avenue
Local Business Manager.....L. M. Dorsey, Jr., 2219 N. 19th Street

Milwaukee Aquarium Society

Regular meetings on First Monday at 105 Grand Ave.
Initiation Fee, $1. Dues, $1.20

President.....C. G. B. Schenk, 105 Grand Avenue
Vice-President.....August Grau, 3110 Grand Avenue
Treasurer.....Geo. J. C. Steffen, 950 First Street
Secretary.....Rev. Paul Roth, 2602 Prairie Avenue
Librarian.....August W. Pollworth, 1816 Wright Street
Local Business Manager.....W. A. Brye, 304 Fifteenth Street

Minneapolis Aquarium Society

President.....F. L. Tappan, 92 South 7th Street
Treasurer.....J. W. Franzen, Curator Museum Pub. Library
Secretary.....Mrs. Anna Essene, 3421 Longfellow Ave. South

Boston Aquarium Society

Initiation Fee, $1 An'l Dues, $1

President.....Tennant Lee, 18 School St., Dedham, Mass.
Secretary.....Chas. W. Alden, 15 Bloomfield St., Boston, Mass.
Treasurer.....Franklin A. Packard, 5 Perry St., Cambridge, Mass.

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